STUDENTS' ADOPTION AND PARTICIPATION IN E-LEARNING DIGITAL APPLICATIONS DURING COVID-19: A COUNSELLING PERSPECTIVE FROM TERTIARY INSTITUTIONS IN DELTA STATE

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Abstract

This study examined students' adoption and participation in e-learning digital applications tertiary institutions in Delta State during the COVID-19 crisis. Guided by two research questions and corresponding null hypotheses tested at the 0.05 significance level, the study employed a descriptive survey design. The target population consisted of 1,890 students from two institutions, with a final sample of 330 respondents selected through a multistage sampling process. Data was collected using the Students' Adoption of E-Learning Applications Scale (SAEAS) and Students' Participation in E-Learning Digital Applications Scale (SPEAS), which were adapted and validated by measurement experts. The instruments' reliability, determined by using Cronbach's Alpha, yielded a coefficient of 0.72. Analytical tools included mean, standard deviation and independent sample t-tests. Findings revealed a high level of adoption and participation in e-learning digital applications among students at both institutions. No significant statistical difference was identified between the two institutions. Based on these results, the study recommends structured seminars and workshops to enhance the ICT proficiency of students and lecturers by the institutional authorities.

Keywords: E learning adoption, e-teaching, student participation, COVID-19 pandemic.

Introduction

Education plays a vital role in shaping individuals into responsible, respectable, and productive members of society. It fosters character development, behavioural modification, and value orientation through the intentional transmission of knowledge and skills within a cultural context, particularly among the youth (Ohaka & Akpomi, 2018). Schools serve as key social institutions designed to fulfil this mandate, shaping children's attitudes, emotions, and behaviours while perpetuating cultural norms, beliefs, and practices across generations (Aljawarneh, 2020). As structured organizations, schools influence students' learning behaviours and instil discipline through formal instruction, guidance, and support.

The emergence of COVID-19 in late 2019 triggered a global health and education crisis.

Educational activities in over 180 countries, including Nigeria, were severely disrupted (McIntosh et al., 2020). Before this era, most Nigerian schools operated using conventional face-to-face instructional methods within physical spaces such as classrooms, lecture halls, and faculty offices. These environments were equipped with the necessary infrastructure like classrooms, desks, chairs, and teaching boards—to support effective learning.

Following the World Health Organization's pandemic declaration on March 11, 2020, Nigerian higher education institutions suspended academic activities, affecting over 1.6 million students (Zaheer & Munir, 2020). The pandemic's sudden onset generated profound emotional and professional challenges. In response, public health authorities implemented several containment measures, including early detection, patient isolation, contact tracing, public quarantine, and nationwide lockdowns (Ezeugo et al., 2020). These measures disrupted in-person education, introduced barriers to home-based learning, and exposed limitations in educational technology, as well as gaps in digital literacy among teachers, students, and parents (Eze et al., 2021).

To sustain academic operations and prevent the total collapse of the educational system, many Nigerian educational institutions transitioned to alternative modes of instruction. These included online teaching, evaluation, counselling, and research supervision. However, effective implementation depended heavily on institutional disposition to integration, students' prior exposure to ICT, their attitudes toward digital learning modalities, and the availability of technological infrastructure.

E-learning refers to the delivery of educational curriculum through the use of Information and Communication Technology (ICT) tools such as internet-based platforms and multimedia (Arinze et al., 2020). It facilitates the development and administration of educational materials, offering flexibility and accessibility across various contexts, including those constrained by geography, time, or health-related challenges (Aboagye et al., 2020). ICT enhances educational outcomes by fostering innovation, improving instructional quality, and offering expanded learning opportunities. According to the E-Learning Acceptance Model (ELAM), user behaviour is influenced primarily by perceived usefulness, ease of use, social expectations, and available support systems.

Online learning also enables students to pursue degrees remotely, providing flexibility in scheduling and access to instructional resources. It reduces administrative burdens such as attendance tracking and lecture preparation while promoting asynchronous and self-directed learning. E-learning encompasses various forms of digital instruction, including computer-assisted learning, web-based education, and interactive digital content. Nonetheless, it contributes significantly to knowledge acquisition, collaborative learning, information retention, and educational quality (Arinze et al., 2020). Despite its benefits, many students remain unaware of its critical role in the broader academic experience.

Studies have explored the integration and effectiveness of e-learning. Aboagye et al.

(2020) investigated e-learning challenges of students during the pandemic, concluding that the hybrid approach of combining online and face-to-face instruction would be beneficial. Ezeugo et al. (2020), similarly studied the use of ICT- enabled tools by 450 academic staff members in Anambra State, revealing widespread integration of digital tools for academic supervision. Ali et al. (2018) found that 98% of surveyed students considered e-learning useful, with analyses showing that learners perceived it as affordable, time-efficient, accessible, and user-friendly. Radha et al. (2020) studied tech-savvy students and confirmed the gross usage of e-learning platforms during the COVID-19 lockdown. Agu and Odimegwu (2014) surveyed ten doctoral students in southeastern Nigeria, concluding that traditional face-to-face supervision remained the preferred method. Nonetheless, the pandemic necessitated a broader and more effective integration of ICT into academic instruction.

Against this backdrop, the present study from a counselling viewpoint investigated students' adoption and participation in e-learning in tertiary institutions in Delta State during the COVID era in Delta State, Nigeria.

Statement of the Problem

The urgency of integrating ICT into educational delivery systems has been the subject of numerous concerns in recent years, particularly during the COVID-19 epidemic, which compelled schools to implement online platforms for learning. This circumstance forced educational bodies to make significant investments in ICT tools to improve the input, output, and general usage of learners.

Despite the proven utility of ICT applications in facilitating efficient data dissemination and learner participation, existing literature reveals that research on e-learning adoption, student acceptance, participation, and institutional support for ICT in learning remains insufficient, especially in Nigeria and other developing countries. This gap is majorly evident in the limited understanding of how students adapt in technology-enhanced learning environments in the context of emergency-driven transitions.

The pandemic-driven shift posed considerable challenges for students who were required to rapidly acquire new technological competencies to participate effectively in the digital learning space. This situation underscored the urgent need to investigate how students navigated these changes and to what extent they embraced and utilized e-learning applications in their academic pursuits. Therefore, the study sought to investigate students' adoption and participation in e-learning among tertiary institutions in Delta State during the COVID-19 pandemic.

Objectives of the Study

The study examined the following:

(i)   students' adoption of e-learning digital applications during the Covid-19 pandemic in tertiary institutions in Delta State,

(ii)   students' participation in e-learning digital applications during the Covid-19 pandemic in tertiary institutions in Delta State.

Research Questions

To guide this study, the following questions were raised:

(i)   To what extent did students at the Delta State University, Abraka and the Delta State Polytechnic, Ogwashi-Uku, differ in their adoption of e-learning applications during the COVID-19 pandemic?

(ii)   To what extent did students at the Delta State University, Abraka and the Delta State Polytechnic, Ogwashi-Uku, differ in their participation in e-learning applications during the COVID-19 pandemic?

Hypotheses

The following hypotheses were developed and put to test at the significance level of 0.05:

H□□: There is no significant statistical difference in the adoption of e-learning applications during the COVID-19 pandemic among students in Delta State University and Delta State Polytechnic, Ogwashi-Uku in Delta State.

H□□: There is no significant statistical difference in the participation in e-learning applications during the COVID-19 pandemic among students in Delta State University, Abraka and Delta State Polytechnic, Ogwashi-Uku in Delta State.

Methodology

This survey design was deemed appropriate for collecting data on students' adoption and participation in e-learning applications during the COVID-19 epidemic. The study population comprised 1890 undergraduate students from Delta State University, Abraka and Delta State Polytechnic, Ogwashi-Uku. Out of tertiary institutions in the state during the 2023–2024 academic session. Taro-Yamane's sample size determinant was used to obtain 330 respondents. The multi-stage sampling approach was also used in three phases to pick a sample. At stage one, two tertiary institutions (DELSU and DSPG) were purposively selected based on their existing ICT infrastructure and active participation in e-learning. Using a straightforward balloting process, the second stage chose five departments each from DELSU and DSPG. Finally, from each of the selected departments, 165 students were randomly chosen using a lottery method, yielding a total sample size of 330 students. Data collection was conducted using two structured instruments adapted from Ezeugo et al. (2021): Students' Adoption of E-Learning Applications Scale (SAEAS) and Students' Participation in E-Learning Digital Applications Scale (SPEAS). There were two portions of the instruments: A and B. Respondents' personal information was included in Section A, while Section B measured students' adoption and participation in digital applications in e-learning contexts. SAEAS and SPEAS are both ten-item, four-point Likert-type scales. The response options were categorized as follows: Very High Adoption (VHA), High Adoption (HA), Low Adoption (LA), Very Low

Adoption (VLA) for SAEAS and Very High Range (VHR), High Range (HR), Low Range (LR), Very Low Range (VLR) for SPEAS.

The instruments were subjected to a revalidation process using a pilot sample of 20 respondents from Delta State Polytechnic, Ogwashi-Uku, to ensure internal consistency. The Cronbach Alpha yielded 0.72 and 0.83 reliability coefficients, respectively. These values confirmed the reliability of the instruments for the main study. With the assistance of trained research aids, 80 copies of the instruments were distributed directly to the participants. An on-the-spot completion method was adopted to prevent data loss and ensure a 100% return rate. Descriptive statistics of standard deviation and mean were used to analyze the data, and a benchmark of 2.50 was established for accepting the mean score. Great participation/high range was defined as any weighted mean score of 2.50 or higher, whereas low participation/low range was defined as scores below 2.50. A robust data analysis was provided by testing the hypotheses at a 0.05 significance level using Analysis of Variance (ANOVA).

Results

Research Question One: To what extent did students at the Delta State University, Abraka and Delta State Polytechnic, Ogwashi-Uku, differ in their adoption of e-learning digital applications during the COVID-19 epidemic?

Table 1: Descriptive Analysis of Adoption of E-Learning Digital Applications During the COVID-19 Pandemic

Digital Applications	Institution	N	Mean	Std. Deviation	Remark
Email	DELSU	165	3.15	1.10	Adopted
	DSPG	165	3.25	1.49	
Telegram	DELSU	165	3.50	1.22	Adopted
	DSPG	165	3.00	0.88	
Google Meet	DELSU	165	3.70	1.17	Adopted
	DSPG	165	3.25	1.12	
Zoom	DELSU	165	3.50	0.99	Adopted
	DSPG	165	3.20	1.09	
Facebook	DELSU	165	2.07	1.41	Not adopted
	DSPG	165	1.90	1.08	
Twitter	DELSU	165	2.40	1.94	Not adopted
	DSPG	165	2.25	1.12	
WhatsApp	DELSU	165	2.65	1.16	Adopted
	DSPG	165	2.75	1.32	
WEBEX	DELSU	165	1.10	0.33	Not adopted
	DSPG	165	1.00	0.63	
Instagram	DELSU	165	2.32	0.07	Not adopted
	DSPG	165	1.50	0.45	
Youtube	DELSU	165	3.07	0.26	Adopted
	DSPG	165	2.52	0.15	

Table 1 demonstrates the descriptive study of DELSU and DSPG adoption of e-learning digital applications. Email, Telegram, Google Meet, WhatsApp, Zoom, and YouTube are the digital applications that, according to the above table, achieved the 2.50 and above standard. Six out of ten digital applications— Email, Telegram, Google Meet, WhatsApp, Zoom and YouTube —were adopted by DELSU and DSPG students, according to the findings, while Facebook, Twitter, Webex and Instagram were not adopted. From a closer perspective, the social media application was not widely adopted. Testing for the examination of major variations in adaptation between these two tertiary institutions is shown in Hypothesis 1.

Research Question Two: To what extent do students at the Delta State University, Abraka and Delta State Polytechnic, Ogwashi-Uku, differ in their participation in e-learning digital applications during the COVID-19 pandemic?

Table 2: Descriptive Analysis of Participation in E-Learning Digital Applications During the COVID-19 Pandemic

Digital Tools	Institution	N	Mean	Std. Deviation	Remark
Email	DELSU	165	3.73	0.69	High
	DSPG	165	2.97	1.09	
Telegram	DELSU	165	3.21	1.17	High
	DSPG	165	3.33	0.91	
Google Meet	DELSU	165	2.79	1.55	High
	DSPG	165	2.67	1.50	
Zoom	DELSU	165	3.16	1.19	High
	DSPG	165	3.96	1.27	
Facebook	DELSU	165	1.69	0.96	Low
	DSPG	165	1.50	0.89	
Twitter	DELSU	165	2.16	1.14	Low
	DSPG	165	1.01	0.99	
WhatsApp	DELSU	165	3.31	0.71	High
	DSPG	165	3.33	0.98	
WEBEX	DELSU	165	2.19	0.55	Low
	DSPG	165	1.19	0.51	
Instagram	DELSU	165	1.31	0.71	Low
	DSPG	165	1.52	0.77	
Youtube	DELSU	165	3.07	0.27	High
	DSPG	165	3.02	0.54	

The descriptive analysis of the variety of digital applications used by DELSU and DSPG is shown by the data in Table 2 above. The digital applications that achieved the 2.50 benchmark and above are e-mail, Telegram, Google Meet, Zoom, WhatsApp, and YouTube. This means that six out of the 10 digital applications (Email, Telegram, Google Meet, Zoom, WhatsApp, and YouTube) were found to be heavily utilized by students of DELSU and DSPG. Comparatively, during COVID-19, students of both tertiary institutions made extensive use of six out of the ten digital applications. The remaining applications, such as Facebook, Twitter, Webex, and Instagram, were seldom ever utilised. Hypothesis two reveals that there is a significant statistical difference in the participation of students in these two tertiary institutions.

Hypotheses

H□□: There is no statistically significant difference in the adoption of digital applications for e-learning during the COVID-19 pandemic among students in Delta State University and Delta State Polytechnic, Ogwashi-Uku in Delta State.

Table 3: Independent Sample t-Test of Significant Statistical Difference of E-Learning Digital Applications Adoption During the COVID-19 Pandemic

Variables	N		SD	df	t-value	t-Crit.	Sig. 2-tailed
Delsu	165	29.52	2.67	328	3.720	1.96	.068
Dspg	165	28.65	3.21				

Table 3 demonstrates the independent sample t-test analysis of the statistically significant difference in the adoption of e-learning digital applications during the COVID-19 epidemic among students at DELSU and DSPG. At the 0.05 level of significance, there is no substantial difference between the two institutions (df = 328, t = 3.720, p = 0.068). The reason is that the p-value is more than the significance value of 0.05. It suggests that the null hypothesis, which posits that "students of DELSU and DSPG did not significantly differ in their adoption of e-learning digital applications during the COVID-19 epidemic," is retained.

This finding indicated that both DELSU and DSPG students demonstrated comparable levels of adoption of digital tools during the epidemic. Nevertheless, a comparison of the mean and standard deviation scores indicates a slightly higher adoption level among students of DELSU and DSPG (M = 29.52, SD = 2.67) compared to those at the (M = 28.65, SD = 3.21). While this difference is not statistically significant, it may point to a marginally greater participation in digital-based learning tools among DELSU students.

H□□: There is no statistically significant difference in the participation in e-learning digital applications for e-learning during the COVID-19 epidemic among students at DELSU and DSPG.

Table 4: Independent Sample t-Test of Significant Difference in Participation in E-Learning Digital Applications During the COVID-19 Pandemic

Variables	N		SD	df	t-value	t-Crit.	Sig. 2-tailed
DELSU	165	29.52	2.67	328	4.639	1.96	.114
DSPG	165	28.65	3.21				

Table 4. The independent sample t-test analysis of the significant statistical difference in the participation in e-learning digital applications by students at DELSU and DSPG during the

COVID-19 epidemic is shown in Table 4 above. At the 0.05 level of significance, the data are df = 328, t = 4.639, and p = 0.114. The p-value is greater than the significance value of 0.05. This indicates that the two tertiary institutions' use of digital applications for e-learning activities does not differ significantly. This suggests that the null hypothesis, which states that "students at DELSU did not significantly differ in their use of digital applications for e-learning during the COVID-19 epidemic," is retained. This indicates that during the COVID-19 epidemic, there are no appreciable differences between DELSU and DSPG students' participation in digital programs for e-learning. The mean and standard deviation ratings for the two institutions, however, indicate that DELSU used more digital applications than DSPG (DELSU = 22.45, 2.67 and DSPG = 21.60, 3.24).

Accordingly, the null hypothesis—that there is no statistically significant difference in the engagement of ICT applications for e-learning during the COVID-19 pandemic among students in Delta State University and Delta State Polytechnic, Ogwashi-Uku in Delta State, is accepted. This outcome suggests that both institutions employed ICT tools for e-learning to a comparable extent. Nonetheless, the descriptive statistics indicate that students from DELSU (M = 29.52, SD = 2.67) reported slightly higher engagement with digital applications compared to students from DSPG (M = 28.65, SD = 3.21), though the difference is not statistical significance.

Discussion

These findings of the study indicate that students from both DELSU and DSPG adopted e-learning digital applications during the COVID-19 epidemic. This result suggests that there was no significant statistical difference in students' adoption of digital applications of the two institutions, underscoring a broad readiness among Nigerian students to adopt digital technologies in education.

It also illustrates how school teaching and learning are progressively moving towards a digital format. However, during the COVID-19 epidemic, the terrible consequences of not being able to interact physically with classmates and lecturers forced these students to embrace using digital applications for learning in compliance with the World Health Organization triple protocol (lockdown, social distancing, and isolation).

The findings align with those of Ezeugo et al. (2021), who observed that ICT tools were welcomed by lecturers, particularly for tasks such as research supervision.

Although the statistical analysis did not reveal significant differences, descriptive statistics indicated a slightly higher level of digital applications among DELSU students compared to their DSPG counterparts. These findings challenge earlier assumptions, such as those suggested by Wood (2021) that students in scientific and technical disciplines might be more inclined toward online learning platforms. Instead, it appears that the urgency created by the pandemic fostered comparable levels of ICT adoption across academic disciplines and institutions.

Regarding the second research question and its corresponding hypothesis, the data

similarly revealed no significant difference in the actual engagement of ICT digital applications for e-learning between the two student populations (DELSU and DSPG). This uniformity in usage could be attributed to a general rise in digital literacy among students, regardless of their academic backgrounds. Moreover, both universities appeared to have adopted and implemented WHO-recommended safety measures and digital learning strategies effectively. These findings are consistent with those of Ali et al. (2018), who reported that a large majority of students found e-learning tools to be affordable, user-friendly, and efficient.

Conclusion

This study concludes that students at both Delta State University and Delta State Polytechnic, Ogwashi-uku, demonstrated significant adoption and engagement of ICT digital applications for e-learning during the COVID-19 pandemic. While Delta State University students exhibited a marginally higher engagement with ICT tools, the overall difference in usage between the two institutions was not statistically significant.

The findings highlight the transformative impact of the pandemic on higher education, particularly in fostering digital learning environments. The experience has demonstrated the potential of ICT to support flexible, accessible, and efficient learning, offering students the ability to access educational resources beyond geographical and temporal constraints. As education systems continue to evolve post-COVID-19, the strategic integration of ICT tools into curricula remains essential to sustaining and enhancing learning outcomes in Nigerian universities and beyond.

Recommendations

— **Capacity Building through Training Programmes**: School administrators should organize regular conferences, workshops, and seminars to educate both students and faculty members on the importance, benefits, and effective use of ICT digital applications for e-learning.

— **Provision of Infrastructure and Internet Access**: To support continuous academic advancement, both governmental and private educational stakeholders should invest in the provision of up-to-date ICT digital infrastructure. Additionally, ensuring consistent and high-speed internet connectivity is essential for the effective implementation of e-learning systems.

— **Stable Electricity Supply**: A reliable and uninterrupted power supply is crucial for the successful deployment of ICT tools in education. The government, in collaboration with relevant power authorities, should work toward improving electricity availability in educational institutions.

— **Curriculum Integration**: Educational planners should integrate ICT literacy and competency training into curricula at all levels of the educational system to foster long-term digital proficiency among learners and educators.

Counselling Implications

— **Counselling intervention for academic excellence in schools** should integrate the use of ICT digital tools. This is to enable them to help students and teachers in the use of ICT digital applications for effective and efficient delivery of curriculum content.

— **Promotion of Constructive ICT Use**: Counselling activities should target and guide students toward the responsible use of ICT resources, encouraging their application for academic enrichment rather than for unproductive or unethical activities.

— **Integration of E-Counselling Services**: School counselling programmes should incorporate e-counselling as a strategic component, thereby broadening access to psychological and academic support services via digital platforms.

— **Orientation and Digital Awareness**: During student orientation programmes, counsellors should introduce and promote the educational benefits of ICT applications, fostering early awareness and positive engagement with e-learning tools.

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